State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #_____
HRI #_____
Trinomial_____
NRHP Status Code_____
Other Listings_____
Review Code_____ Reviewer_____ Date_____

 Resource name(s) or number(assigned by recorder) N-234

P1. Other Identifier: Thermal Protection Laboratory
***P2. Location:** ☒Not for Publication ☐Unrestricted ***a. County** Santa Clara
***b. USGS 7.5' Quad** San Francisco North, Calif. **Date:** 1995
***c. Address** 370 Boyd Road **City** Moffett Field **Zip** 94035
***e. Other Locational Data:**

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Building N-234 is a two-story laboratory and office building with a concrete foundation, scored concrete exterior, and a flat roof. This building has two distinct massings: a concrete office portion and a corrugated metal laboratory portion. On the first and second floors are rows of three-panel aluminum-sash awning windows. These windows have concrete canopies, which line the south and east façades. The main entry on the south façade is marked by roman brick siding, planters and a pair of glazed aluminum doors. Along the east façade of the corrugated metal portion is a metal fire stair. The north façade is lined with mechanical and laboratory equipment. At the west end of the building is a brick garden wall, which conceals additional mechanical equipment. This facility was used for materials research in heat shield applications and aerodynamics studies of vehicles in planetary atmospheres. The building is 24,670 sq. ft.

For technical description, see Continuation Sheets.

This building appears to be in good condition.

***P3b. Resource Attributes:** (list attributes and codes) HP6 – Commercial Building: Offices; HP39 – Other: Laboratory

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other

P5a. Photo

P5b. Photo: (view and date)
View of South Façade (08/04/05)

***P6. Date Constructed/Age and Sources:** 1962

***P7. Owner and Address:**
United States of America as represented by National Aeronautics and Space Administration (NASA)

***P8. Recorded by:**
Page & Turnbull, Inc.
724 Pine Street
San Francisco, CA 94108

***P9. Date Recorded:** 08/04/05

***P10. Survey Type:**
Reconnaissance

***P11. Report Citation:** National Aeronautics and Space Administration, *Technical Facilities Catalog*, Volume 1, publication NHB 8800.5A (1), October 1974; Technical Information Division, Ames Research Center, *Ames Research Facilities Summary,* 1974; Donald D. Baals and William R. Corliss, *Wind Tunnels of NASA,* NASA SP-440, 1981.

***Attachments:** ☐None ☐Location Map ☐Sketch Map ☒Continuation Sheet ☐Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (list)

3b. HEAT TRANSFER TUNNEL

DESCRIPTION:

The Heat Transfer Tunnel is a hypersonic wind tunnel driven by two different four megawatt arc-heaters. This tunnel has a wide range of operating characteristics, and utilizes an extensive variety of nozzle configurations. Nozzle exit diameters up to 24 inches, and throat diameters up to a diameter of one inch are available. Models with specimen diameters up to six inches can be accommodated. The model support system can handle a total of 18 models with diameters up to two inches (a lesser number of models with larger diameters can be accommodated). Support arms are arranged radially, and models are inserted into the effluent gas stream and retracted in sequence by a series of linear motion actuators. Run-time is ten minutes.

PERFORMANCE:

Stream Enthalpy	1,500 to 15,000 BTU/lb.
Mach Number	2.5 to 15 (variable)
Stagnation Pressure	0.01 to 9.0 atmospheres
Plenum Pressure	1,000 psi, maximum

STATUS:

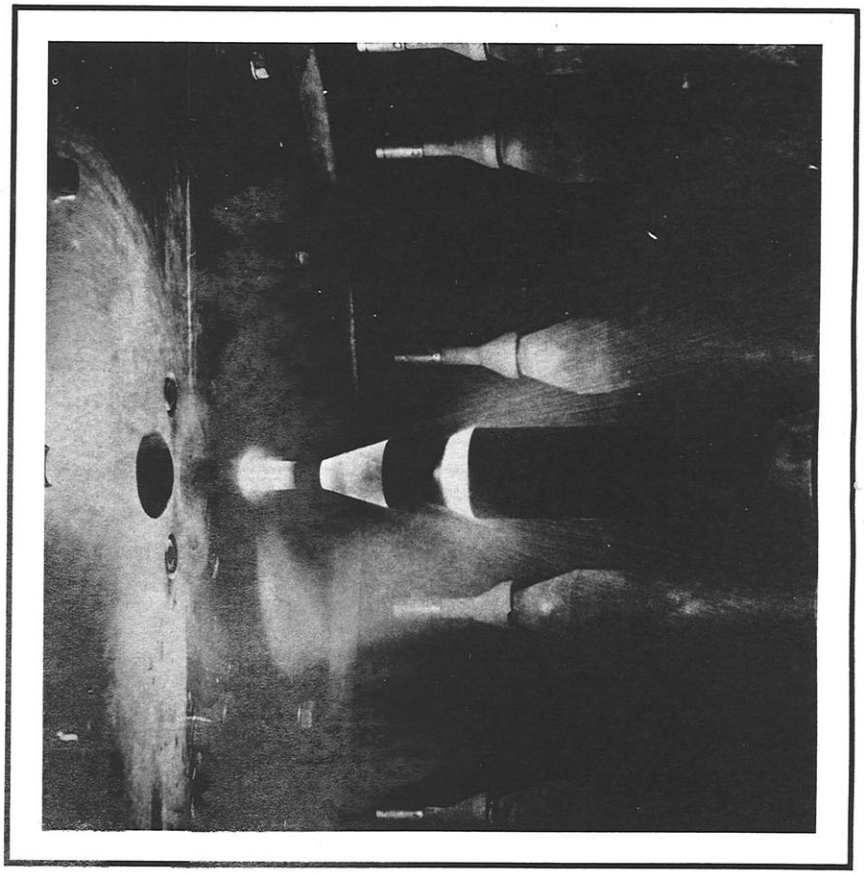
Operational since 1962

JURISDICTION:

Thermo- and Gas-Dynamics Division
Thermal Protection Branch
Howard K. Larson

LOCATION:

Building N-234



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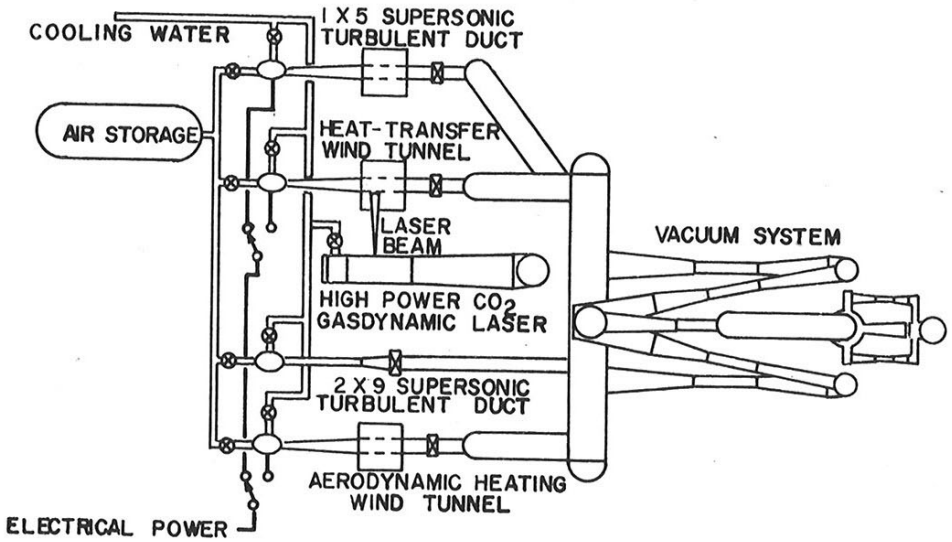
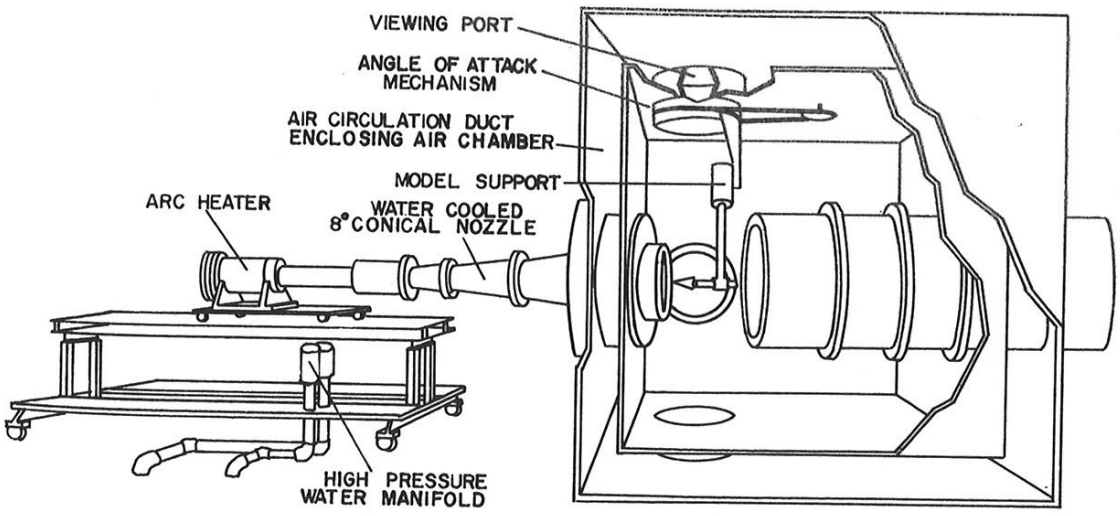


DESCRIPTION

The Thermal Protection Laboratory is used to research materials for heat shield applications and for aerodynamic heating and materials studies of vehicles in planetary atmospheres. It is comprised of 5 separate facilities: an aerodynamic heating tunnel, a heat transfer tunnel, 2 supersonic turbulent ducts, and a high-power CO_2 gasdynamic laser. All these facilities, with the exception of the large combustion-type laser, are driven by arc-heaters. The arc-heated facilities are powered by a 20-MW dc power supply. Their effluent gas stream (test gases: air, N_2, He, CO_2, and mixtures; flow rates from 0.05 to 5.0 lb/sec) discharges into a 5-stage steam-ejector-driven vacuum system. All of the facilities have high-pressure water available at flow rates up to 4000 gal/min. The data obtained from these facilities are recorded on magnetic tape or oscillographs.



- The aerodynamic heating tunnel is a hypersonic wind tunnel with a wide range of operating characteristics. It utilizes an extensive variety of nozzle configurations. Nozzle exit diameters up to 42 in. and throat diameters up to 2 in. are available. Models with specimen diameters up to 12 in. can be accommodated. Two support systems are available—an angle of attack system and a traversing system. Run time is continuous.

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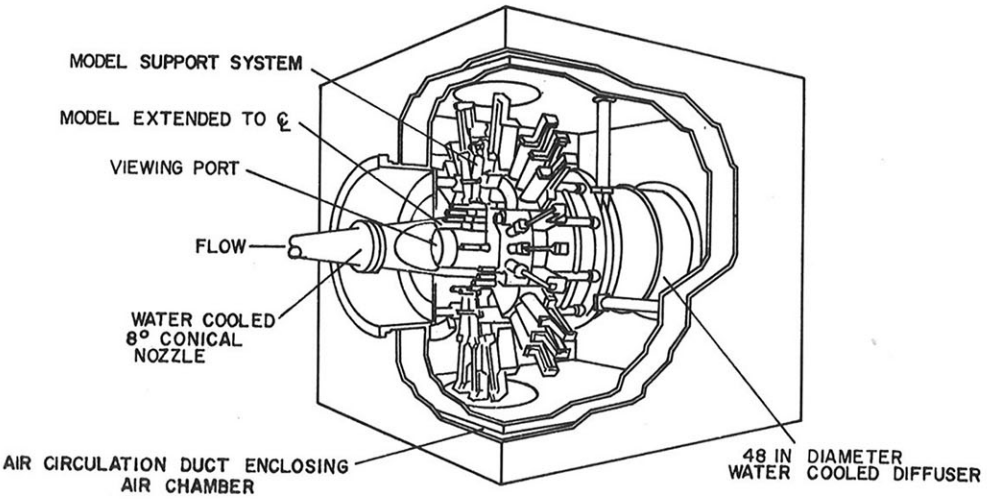
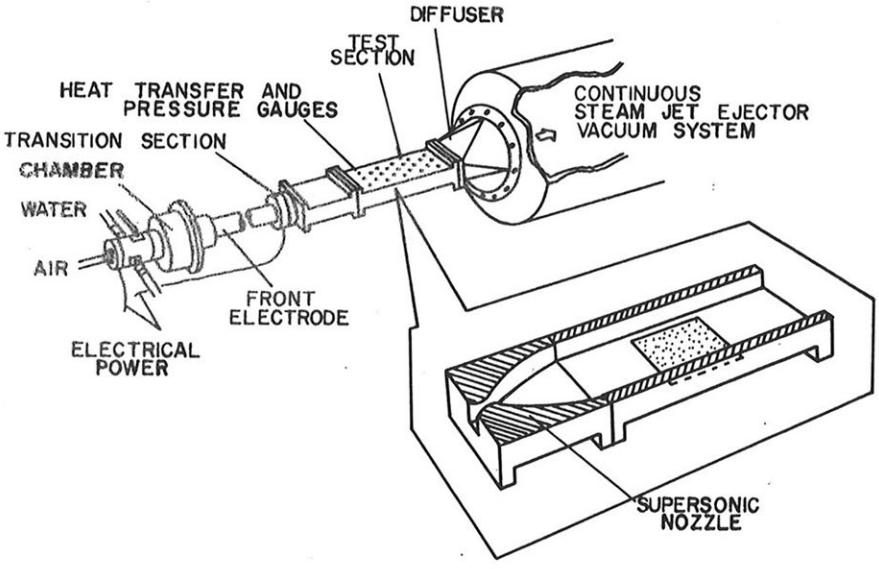


- The heat transfer tunnel is a hypersonic wind tunnel with a wide range of operating characteristics. Nozzle exit diameters up to 24 in. and throat diameters up to one in. are available. Models with specimen diameters up to 6 in. can be accommodated. The model-support system can handle a total of 18 models with diameters up to 2 in., or fewer models with larger diameters. Support arms are arranged radially; models are inserted into the effluent gas stream and retracted in sequence by a series of linear motion actuators. Run time is 10 min.



- The 1-in. x 5-in. and 2-in. x 9-in. supersonic turbulent flow ducts are used to study highly active turbulent 2-dimensional fluid flows over a flat surface. Both ducts are rectangular; the 1-in. x 5-in. duct can accommodate models 4 in. wide x 6 in. long, and the 2-in. x 9-in. duct can accommodate models 8 in. wide x 10 and 20 in. long and any desired depth. Run times are continuous for both ducts.

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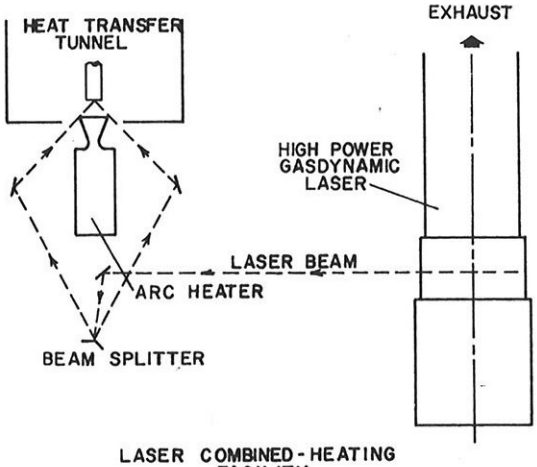
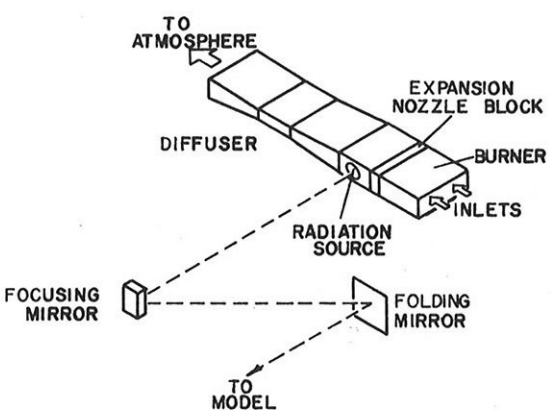


LASER COMBINED-HEATING FACILITY



HIGH POWER CO_2 GASDYNAMIC LASER

- The high-power CO_2 gasdynamic laser is a combustion-driven laser capable of producing radiative energy at a wave length of 10.6μ. It can be configured in 2 modes—with an unstable resonator cavity and a stable multi-mode cavity. The uniformity and power available from either configuration are variable, depending on the optics used to focus and position the beam. The beam generated by the unstable resonator can be manipulated much more readily than the output beam from the multi-mode cavity. In addition, the beam generated by the unstable resonator can be transferred into the test section of the heat transfer tunnel, allowing a test section specimen to be exposed to both an arc-heated gas stream and a radiative beam.